

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1 - 17. (canceled)

18. (currently amended) A method for constructing multiple alternative execution plans for a single database query, comprising:

constructing one of the execution plans by—

selecting one of a plurality of operators from a root group of a data structure having a plurality of groups of alternative operators, certain of the operators having pointers to one or more different ones of the groups,

selecting one of a plurality of the operators in at least one of the different groups,

repeating the preceding act of selecting one of a plurality of the operators in at least one of the different groups until reaching an operator ~~those of the operators~~ not having a pointer ~~pointers~~ to another one of the groups,

repeating the above acts, selecting at least one different operator for each of the constructed plans, where rank data is determined for each operator that distinguishes that operator from alternative operators in other groups, where rank data is determined for each group, and where the rank data can facilitate the constructing of one of the execution plans.

19. (original) The method of claim 18 where the operators are selected by accessing a directory containing their locations in the data structure.

20. (canceled)

21. (previously presented) The method of claim 20 further comprising the act of adjusting the rank of one of the selected operators after it has been selected.

22. (canceled)

23. (previously presented) The method of claim 18 further comprising the act of receiving a specification containing at least one global rank designation, and where the selecting acts select their respective operators in response to the global rank designation.

24. (original) The method of claim 23 where the respective operators are selected such that the global rank designation uniquely identifies a single one of the alternative execution plans.

25. (original) The method of claim 23 where the specification contains a plurality of global rank designations.

26. (previously presented) The method of claim 25 further comprising the act of deriving the plurality of global rank designations from the specification.

27. (original) The method of claim 18 where the operators and pointers form a tree structure.

28. (original) The method of claim 27 where each operator is selected in each repetition in a manner such that all of the possible alternative plans has approximately the same probability of being unranked.

29. (currently amended) The method of claim 27 where the probability of selecting an each operator in each group is proportional related to the number of possible subtrees of the respective operator in relation to the total number of subtrees of all operators in the respective group. ~~operators in the subtree of the each operator.~~

30. (currently amended) A medium bearing representations of instructions and data for causing a suitably programmed computer to perform the method comprising the acts of:

constructing one of the execution plans by –

selecting one of a plurality of operators from a root group of a data structure having a plurality of groups of alternative operators, certain of the operators having pointers to one or more different ones of the groups,

selecting one of a plurality of the operators in at least one of the different groups,

repeating the preceding act of selecting one of a plurality of the operators in at least one of the different groups until reaching an operator ~~those of the operators~~ not having a pointer ~~pointers~~ to another one of the groups,

repeating the above acts, selecting at least one different operator for each of the constructed plans; where rank data is determined for each operator related to a number of alternative operators in the other of the groups; where rank data is determined for each group; where a local rank is assigned to each operator which is related to alternative operators associated with that operator in another one of the groups; where a global rank is produced for at least one of the execution plans from the rank data; and where the rank data and global rank can facilitate the constructing of one of the execution plans.

31. (original) The method of claim 30 where the medium is a storage medium.

32. (original) The method of claim 30 where the medium is a signal transmitted on a network of computers.

33. (currently amended) A system for validating multiple alternative execution plans for a single database query, comprising:

a search engine responsive to the query for constructing a data structure containing a plurality of groups each including a number of alternative operators, at least some of the operators having pointers to one or more different ones of the groups;

a ranking module for ranking the operators in the groups and for unranking them so as to construct a plurality of different execution plans for the query, wherein each execution plan is assigned a unique global rank, based on operator rank data, that identifies one respective execution plan from all other possible execution plans; and

a validation module for validating the execution plans from the ranking module.

34. (original) The system of claim 33 where the data structure is a table.
35. (original) The system of claim 33 further including a specification for specifying a number of different plans to be constructed.
36. (original) The system of claim 33 further including a directory containing locations of the groups and operators within the data structure containing the groups.
37. (currently amended) A computer readable medium that configures a computer system to perform a method, the medium including a A-directory for a data structure having a plurality of groups of alternative operators for carrying out a database query, at least some of the operators having pointers to one or more different ones of the groups, the directory including
- indicia representing locations of the operators within the data structure;
- rank data for each operator related to alternative operators in other of the groups; and
- ~~representing a number of alternative plans associated with that operator.~~
- a global rank based on the operator rank data for each alternative plan that uniquely identifies one respective plan from every other alternative plan.
38. (previously presented) The system of claim 36 where the directory includes rank data for each group representing a number of alternative plans associated with that group.

39. (new) The method of claim 18, wherein determining rank data for each operator further includes assigning a local rank for each operator related to a number of alternative operators associated with that operator in other of the groups and wherein a unique global rank is produced for each of the alternative execution plans from the rank data.

40. (new) A method for generating a plan for executing a database query, the method comprising the steps of:

arranging a plurality of execution plans into a plurality of groups, each group having at least one operator associated with at least one operator in another of the groups;

determining identification data for each operator related to other operators in the other of the groups; and

determining identification data for each execution plan based on the identification data for each operator, whereby the identification data for each execution plan uniquely identifies the respective execution plan from all other execution plans.

41. (new) The method of claim 40, wherein the identification data for each execution plan represents a combination of operator choices within the groups used to obtain the respective execution plan.

42. (new) The method of claim 40, wherein the rank data for the execution plans is represented by consecutive designations, whereby a valid execution plan can be generated

for any designation selected at random, and that different designations will produce different execution plans.

43. (new) A method for generating a plan for executing a database query, the method comprising the steps of:

developing groups of operators representing alternative execution plans for a query;

ranking the operators;

assigning identifiers to the alternative execution plans based on the ranking of the operators;

assembling an execution tree for a selected execution plan by unranking the selected execution plan, wherein unranking the selected execution plan involves selecting one of the operators from each group associated with the identifier of the selected execution plan.